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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,489	09/27/2001	Richard C. Chu	POU920010084US1	3745

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05/28/2003

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EXAMINER

LAM, CATHY FONG FONG

ART UNIT

PAPER NUMBER

1775

4

DATE MAILED: 05/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

HL

<b>Office Action Summary</b>	<b>Application No.</b> 09/965,489	<b>Applicant(s)</b> CHU ET AL.	
	<b>Examiner</b> Cathy Lam	<b>Art Unit</b> 1775	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 15-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____   |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> | 6) <input type="checkbox"/> Other:  |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1 - 14, drawn to a thermal conduction package, classified in class 442, subclass 149.
  - II. Claims 15 - 26, drawn to a method of fabricating a thermal spreading device, classified in class 264, subclass various.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as welding or adhesive bonding.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Philmore Colburn on April 3, 2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 1 - 14.

Affirmation of this election must be made by applicant in replying to this Office action. Claims 15 - 26 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A Boyd whose telephone number is 703-305-7082. The examiner can normally be reached on Monday thru Friday (8:30am - 6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached on 703-308-2414. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jennifer Boyd  
April 23, 2003

***Claim Objections***

1. Claim 2 is objected to because of the following informalities: the word "amaterial" is believed as an error. Appropriate correction is required.

***Claim Rejections - 35 USC § 102/103***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-6 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Gungor et al (US 5944097).

Gungor discloses a substrate carrier (10) which is placed between electronic device(s) (18) and a heat sink (14) (Fig. 2).

The substrate carrier is a composite material which is thermally compatible with the electronic ceramic substrate on which the electronic devices are formed.

The substrate carrier comprised of an aluminum matrix reinforced with ceramic particulates such as silicon carbide, boron carbide, diamond powder or graphite fibrous material (col 2 L 60-64). The substrate carrier includes openings in the thickness direction, and copper based inserts are placed in the openings (col 2 L 64-65). The

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copper based insert can be a copper based diamond particle reinforced composite (col 4 L 42-43). The copper based inserts come in various shapes and sizes (col 3 L 11-12).

The examiner takes the position that the copper based inserts are analogous to the conduits of the present invention.

Gungor is silent about the thermal conductivities between the surface of the carrier and the side wall of the carrier. Furthermore, from the figures of Gungor the copper based inserts are not all circular cross sectioned nor are they equally spaced.

Gungor's substrate carrier which comprises the same ingredients and similar structure as the present invention, it would be obvious that the thermal conductivity in the vertical direction would be greater than the horizontal direction because the copper based inserts which are highly thermal conductive, are placed below the heat generating devices (18) (col 4 L 36-40).

***Claim Rejections - 35 USC § 103***

5. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gungor et al (US 5944097) in view of Eckblad et al (US 6407922).

Gungor discloses a substrate carrier which is used to dissipate heat from electronic devices.

Gungor however is silent about having an adhesive layer and a thermal paste for bonding the substrate carrier (or heat spreader) to the electronic devices and the heat sink, respectively.

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Eckblad teaches a heat spreader (5) which is placed between a semiconductor chip (3) and a heat sink (7). The heat spreader is comprised of carbon nanotubes and an organic or inorganic matrix (col 3 L 20-22).

The heat spreader is bonded to the semiconductor chip (3) and the heat sink (7) through a thermally conductive adhesive (col 5 L 44-48).

Eckblad is silent about the ingredients used for the thermally conductive adhesive, however one skill in the art would choose a suitable material for the invention because it is a matter of design choice.

Regarding to the conduits that extend into the adhesive layer and the thermal paste, such feature would be obvious because the conduits need to be in contact with the heat source in order to maximize the heat transfer (or conductive heat transfer) (col 3 L 20-22).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cathy Lam whose telephone number is (703) 308-2418. The examiner can normally be reached on 9am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9604 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

A handwritten signature in cursive script that reads "Cathy Lam".

Cathy Lam  
Primary Examiner  
Art Unit 1775

cfl  
May 22, 2003